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MEDICINE A SCIENCE;

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OR,

DISEASE A UNIT:

BY H. BACKUS, Selma, Ala.

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PRINTED BY JOHN HARDY.
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The substance of the following Essay appeared in the "Transactions of the Alabama State Medical Association," for the years 1852 and 1854. Time and labor have enabled the author to present the subject in what he considers a more tangible and practical shape, and in the hope of contributing something to the advancement of Medicine, it is again presented to the consideration of an enlightened Profession.

Among other works not mentioned in this Essay, and to which we are largely indebted, we would especially name the following: Cook's Pathology and Therapeutics, Herschel's Discourse on the study of Natural Philosophy, Mills' System of Logic, M. M. Bertin and Bouilland On the Heart, Carpenter's General and Comparative Physiology, Johnston's Physical Atlas, and Draper's Chemistry of Plants.

SELMA, JAN. 1, 1855.

H. B.

MEDICINE A SCIENCE ; OR, DISEASE A UNIT.

If Medicine is not destined to forever halt in the domain of Empiricism,—if it is capable of becoming a Science—then there must be a common condition lying at the bottom of all special diseases,—then all pathological phenomena must acknowledge a common cause. This, and this alone, can constitute medicine a Science ; this, and this alone, constitutes Astronomy a science.

The efforts of Newton were not directed to the discovery of original individual facts, but rather to the discovery of the connecting links which should serve to bind together the individual facts and minor generalizations attained by his predecessors, into one great Whole.

In attempting to accomplish for Medicine, what Newton accomplished for what is called Physical Science, we may seem to attempt the unattainable ; but believing that there is nothing in the nature of our subject which forbids a reasonable expectation of its accomplishment,—believing that the individual facts and minor generalizations are abundant and ready, and that the advanced Medical Mind is now prepared to receive and appreciate their connection, we boldly encounter the task ; resting all upon the validity of our arguments, hoping for nothing which cannot stand the test of the severest logical criticism.

That there is nothing in the present state of Medicine which forbids the conclusion that our object is attainable, may be seen in the fact, that Astronomy and all that are now called exact sciences, were once in a state of Empiricism—once occupied the same ground that medicine now occupies,—once encountered the same difficulty,—the Cause of physical phenomena being deemed occult, innate, mysterious and past finding out—having its analogy in the Vital Force of physiologists.

That there is nothing in the Diversity exhibited by Pathological Phenomena which forbids the conclusion that all are produced by a common cause, may be seen in this—that quite

as great Diversity in what are called Physical Phenomena, have been reduced to a Common Law. "Complex and obscure as the laws of the material Universe may appear to the superficial observer, surrounded by difficulties and lost in the maze of phenomena around him, he might be tempted, like the philosophers of old, to refer every effect to its own peculiar cause; a cause innate to the substance, essential to it, and animating like a soul. Far otherwise are the conclusions arrived at by him who, patiently investigating the appearances of the material world, is guided by the inductive reasoning of the Baconian school; he traces effects to their proximate causes, and generalising these, is led to the discovery of a few simple laws, observing which atom unites to atom, and mass to mass, to form a world, rolling in its appointed sphere around the centre of our system, the great source of light and heat; he soon discovers that, in the beautiful simplicity of Nature's laws, the apparently most insignificant and most gigantic effects are frequently produced by one and the same cause; he discovers that the very law which presides over the motions of the luminous orbs which roll in space around him, causes the scattering of flour from the edge of the mill-stones, and of drops of water from the wet revolving carriage-wheel. That the law regulating the falling of an apple towards the earth, is identical with that which retains the mountains on their broad bases, and the planets in their spheres. Nay, more,—he learns that with such consummate wisdom have cause and effect been related, that the very same power is often sufficient to produce effects apparently totally opposed. Thus, the force by which the ocean is retained in its bed is the same as that by which the ships float upon its surface; the law which regulates the velocity of a falling avalanche, is identical with that by which the balloon ascends in the air—and the power by which the torrents in the falls of Niagara acquire their terrific velocity, is the same which has retained unmoved for ages, the solid rocks from which they descend."—Bird's Natural Philosophy, page 39.

Reasoning still from analogy, there is nothing in the Diversity of phenomena exhibited in the several Sciences, which forbids the conclusion that they are but 'departments' of one great whole—that a Common Plan lies underneath all—that all are produced by a common cause,—pressure—Gravitation.

That there is nothing in the Diversity of what are called Exciting causes, which forbids the conclusion that disease is a unit, may be seen this—that they all produce a common

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state. Assuming, for the present, that disease is obstructed circulation—a relatively increased pressure of blood to the returning pressure of the heart or blood-vessel, which state is marked by the terms debility, dilatation, congestion, or obstruction,—we may obstruct the circulation by the application of a flax, cotton, or silk ligature to the vessels; these ligatures, like exciting causes, may apparently differ from each other, but they are not different causes of the obstructed circulation; they obstruct the circulation by virtue of their point of agreement—pressure.

A certain degree of pressure upon the brain produces convulsion; the exciting cause may be a stick, a stone, a piece of metal, a spicula of bone, the finger, or blood; yet it is not to anything distinctive in the exciting cause that we are to attribute the convulsion, it is in the point of agreement—the pressure—that we are to seek the proximate cause.

If we take from stimulants, as brandy, ether, opium, quinine, ammonia, &c., the effect which they produce in common—increased action, increased pressure—we take all.—Some act more speedily, and some more permanently than others, thus adapting them to different conditions; hence the choice.

Exciting causes produce a common state.

William's principles of Medicine, page 23—28.—“Debilitating causes of predisposition are the most numerous of any. So we might expect from the fact that constitutional strength generally implies power of resisting disease. The weakness which renders the body liable to disease is that especially which enfeebles the heart and impairs the tone of the arteries. * The following are the chief of this class:—Imperfect nourishment—impure air—excessive exertion of body or mind—want of exercise and sedentary habits generally—long continued cold—long continued heat—habitual intemperance with intoxicating liquors—depressing passions of the mind, as fear, grief and despondency—excessive and repeated evacuations, either of blood or of some secretion—previous debilitating diseases. Hitherto we have considered only those circumstances which predispose to disease by their weakening influences. There are others of a somewhat opposite character, which favor the production of disease by a state of excitement or activity.” It must be borne in mind that stimulants and sedatives produce a common state. * Cyclopaedia Pract. Medicine, Art. Cold. A. “Caloric, or heat as it is commonly termed, acts as a stimulant when applied to

the animal body, its effects being local or general according to the extent and degree of its application : it increases, like most other stimulants, the action of the heart and blood-vessels ; but (as is also the case generally with stimulants) a secondary effect occurs, which consists in a collapse, (or in an action lower than that which is natural) after the excitement has subsided. Effects exactly the reverse of these take place from the abstraction of caloric, or, to use the common phrase, from the application of cold. Heat is therefore a stimulant and cold a sedative." This extract illustrates this important point—that stimulants and sedatives produce a common state—secondarily in the case of stimulants and primarily in the case of sedatives—which *common state* we define to be disease.

Williams' Principles of Medicine, page 152.—Malaria, and the influences which produce continued and exanthematous fevers, seem to have the same effect as external cold, but it is not so easy to explain how they operate. The cold stage of these diseases exhibits in a high degree, the marks of intropulsive congestion ; and it is well known that in ague the congestive enlargements of the liver and spleen are among its most remarkable phenomena. The congestions remaining during the febrile stages of fevers, seem to be the chief causes of their inflammatory complications."—Ibid, page 67. "The direct operation of most of this class of causes, [~~Endemic, Epidemic and~~ Infectious] is *depressing*, and where they are strongest and prevail most, the resulting disease is one of depression, adynamia, asthenia, or prostration of the vital powers. These causes, as exhibiting a noxious property opposed to life, are therefore commonly designated *specific poisons*. But there is the antagonist principle of vital resistance in the system, which leads to various processes of reaction, which may be exhibited in different degrees, according to the relative strengths of the poison and of this resisting power."

Druitt's Surgery, 1st chapt. "As the most proper commencement of a systematic treatise on Surgery, we shall begin by describing a state commonly known as *prostration*, *collapse*, or shock to the nervous system, by which terms we signify that general *depression* of the actions and powers of life, which immediately follows any severe injury, such as a compound fracture, or gun-shot wound. * * Causes.—Great and sudden extremes of grief, or joy, or fear, or cold ; large doses of any active poison, such as arsenic, sulphuric

acid, or tobacco ; the sudden impression of miasmata, or of morbid poisons, as the plague ; great loss of blood, and mechanical injuries." In these extracts all the recognised exciting or predisposing causes of disease are mentioned, and, like the Ligatures, they produce a *common state*.

That there is nothing in the Diversity of Names, applied to what are called special diseases, which forbids the conclusion that a common condition lies at the bottom of all, is seen in this—that those names refer to organs, localities, and prominent symptoms, but do not connote states—do not penetrate into conditions. To illustrate : Williams' principles of Medicine, page 159. " Congestion of the intestines, causes diarrhea ; congestion of the uterus, causes leucorrhœa ; congestion of the kidneys, watery and sometimes albuminous urine ; congestion of the lungs and pleura, hydrothorax ; of the heart, hydropericardium ; of the abdomen, ascites, &c." Now, if the names diarrhea, leucorrhœa, albuminuria, hydrothorax, hydropericardium, ascites, &c., were connotative—if they implied states or conditions, it is evident that their connotation would reside in the common condition—the congestion—as the cause of all. We shall hereafter see the whole list of special diseases arise from congestion, and if their names went to the bottom, if they went down to conditions, they would connote this common condition—would imply 'unity' in disease. Names, are necessary as marks put upon organs, localities and symptoms, to render them subjects of discourse, but we should not let arbitrary names and distinctions which are created for purposes of description, lead us to suppose that those distinctions were real, or existed in nature.—

The State of Alabama is divided into counties, for the convenience of the people, and those counties have received Names as marks set upon them to render localities, &c. subjects of discourse ; but the most accomplished Botanist or Geologist in the land, could not tell from any natural distinction when he passed from Dallas into Lowndes.

In the farther prosecution of our subject, one great point which we shall attempt to develop, and which, if we succeed in developing, will bring our argument within common observation, so to speak, is, that whatever is true of the heart, or mass, is true of the capillary or molecule. A synopsis of the argument will here be given, referring to our essay as a whole, for final confirmation.

The heart and its force, is a condensation of capillaries and their forces, therefore the heart or mass in disease, brings into

sensible view, or repeats in a sensible form, the condition in disease of its molecular capillary type. Or, to state much the same thing in different words: Microscopic observation shows that when certain agents are applied to the capillaries, they are excited to increased action, contract more rapidly and energetically upon their contents, accelerating the motion of their contents; that, if this stimulation is carried beyond a certain point, or continued beyond a certain time, the capillaries are exhausted from over-exertion, yield to the internal pressure of blood, are dilated, congested, obstructed; and that the application of certain other agents, seem to produce this latter state primarily. Common observation shows the same to be true of the heart, as seen in the operation of stimulants and sedatives—heat and cold—in the exhaustion which supervenes upon over-exertion. Any conclusion, then, which may be legitimately drawn from the heart or mass, is equally applicable to the capillary, or molecule,—with this additional security against error, that where the heart or mass is involved, common observation comes into play, the extent of surface being larger, the period of incubation longer, giving us *time* to note with more correctness the order of occurrence in the changes which take place.—Finally, for the present, the same doctrine is held in relation to the heart in hypertrophy, that is held in relation to the capillary in inflammation, and which is held in relation to the general system in fever,—the majority holding, that a state known as debility, dilatation, congestion or obstruction, is an invariable antecedent of all; while the minority hold, that this state is not an invariable antecedent; that, although it *always co-exists with* inflammation, fever and hypertrophy, yet that this co-existent dilatation, congestion, or obstruction, may be, and sometimes is, the direct result of an increased vital action in the part or system affected.

As the terms debility, dilatation, congestion, and obstruction, are used as synonymous, and as they are applied indiscriminately to heart and capillary, we will here explain their meaning: By looking at the heart in dilatation we obtain a clear conception of them—of the state of which they are marks. It will there be seen that they are relative terms, and that they are marks put upon a relatively increased pressure of blood to the returning pressure of the heart.—Hope on the heart, page 293. "Dilatation of the heart is a purely mechanical effect of over-distension. Blood, *accumulated* in its cavities, exerts a pressure from the centre to

wards the circumference in every direction ; and when once it surmounts the resistance offered by the contractile and elastic power of the parietes, these necessarily yield and undergo dilatation." Page 299.—" Taking into consideration this form alone, (simple dilatation) and admitting on the foregoing grounds that it is capable of producing all the phenomena of an obstructed circulation, we have next to inquire how, or by what mechanism it produces them. To answer this question—it produces them by putting the muscular fibres of the heart preternaturally on the stretch, whereby their contractile power is diminished : they lose, as it were, in force, what they gain in length ; and it is this deficiency of power in the main-spring of the circulation which constitutes the obstacle, if it may be so called, to the circulation ; in the same way that weakness of the spring of a time-piece retards its movements." Dilatation, then, implies debility, congestion, obstruction.

Prior to the discovery of the circulation, the views of pathologists upon the proximate cause or real nature of disease, were so vague and indefinite, as to be of little comparative value in this investigation. The facts, however, which struggle up to the earliest records of Medicine—that line of perpetual congelation to Science—bear the same relation to the massive generalizations of Modern Mind, which the Lichens and Mosses that creep to the line of perpetual snow bear to the Oaks and Elms of temperate climes—they furnish the conditions of subsequent improvement, or of larger and more vigorous growth. Our generalization will be chiefly restricted, then, to the period which has elapsed since the discovery of the circulation, drawing such general conclusions from preceding times, in confirmation, as shall be deemed legitimate.

We are now prepared to enter upon the general argument, and although the preceding observations which are intended as explanatory, have anticipated much of that argument, yet we trust it will hereafter appear that we have not attempted to beg conclusions.

The fundamental condition requisite to the development, growth and maintenance of an organised body exhibiting the phenomenon of life, is, a constantly circulated supply of the materials of which it is composed.

The truth of this proposition appears in the fact that, all bodies, organic and inorganic, are built up by molecular condensation, aggregation or arrangement ; to condense, aggreg-

gate, or arrange these molecules into forms or bodies, involves motion—circulation. Again, every phenomenon exhibited by living beings, is at the expense of a disintegration of a portion of the tissue or organ exhibiting such phenomenon: Somatic life, is at the expense of molecular death; we live, by dying. Hence a necessity of a constantly circulated supply of materials for reproduction—maintenance.

Molecular motion, then, is the type, the antecedent, the base of the motion of the mass, the antecedent and base of all forms, all phenomena, since molecular motion builds up, sustains, disintegrates or pulls down.

To observation, the conditions of form, of phenomenon, are media of different densities, acting upon each other—pressing upon each other—represented in air, water, and the earth.

There must be resistance to motion, as a fulcrum for motion. This is no more paradoxical than, that death is the condition of life, or than, that the invisible is the condition or type of the visible. It is the action, resistance, pressure of media of different densities upon each other, that exhibits form, phenomenon.

Organic bodies, being specializations of inorganic bodies, the same conditions of form, of phenomenon, obtain in the former as in the latter, viz: Media of different densities acting upon each other—pressing upon each other—represented in their solids, liquids, and fluids.

These conditions are common:—they obtain wherever there is form, or phenomenon; whether involving molecules or masses—the organic or inorganic worlds:—heat, light, electricity, pressure, Gravitation—the common Force.

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All pathological phenomena are produced by pressure; dilatation, and dilatation with hypertrophy of the heart, are pathological phenomena; therefore, dilatation and dilatation with hypertrophy of the heart, are produced by pressure.

Hope on the heart, page 293.—“Dilatation of the heart is a purely mechanical effect of over-distention. Blood, *accumulated* within its cavities, exerts a pressure from the centre towards the circumference in every direction; and when once it surmounts the resistance offered by the contractile and elastic power of the parietes, these necessarily yield and undergo dilatation.”

Ibid, page 252.—“The reader must here again be reminded that the exciting causes of dilatation are equally those of hypertrophy, and that, supposing no unknown agencies to interfere, as may sometimes possibly happen, it depends on the

proportion which the cause bears to the reacting energy of the cavity exposed to its influence, whether that cavity becomes affected with dilatation, with hypertrophy, or with a combination of the two." Ibid, page 244.—"In the same way, when, from mechanical obstruction or any other cause, blood is inordinately *accumulated* in the heart, the organ is provoked to extraordinary efforts; it struggles against the *obstacle*; it frets and labors to overcome it; the coronary arteries are excited to increased activity; augmented nutrition (hypertrophy) ensues."

We have seen that a 'relatively increased pressure of blood to the returning pressure of the heart,' was marked by the terms, debility, dilatation, congestion, and obstruction. Increased action—increased pressure—is marked by the terms, reaction, inflammation, fever, and hypertrophy.

Dilatation then, is congestion, and hypertrophy reaction; and as dilatation and hypertrophy are produced by pressure, therefore, congestion and reaction are produced by pressure.

As dilatation with reaction or hypertrophy, and congestion with reaction or inflammation, and debility with reaction or fever, have the same antecedents or cause, and as dilatation with reaction or hypertrophy, is produced by pressure, therefore, congestion with reaction or inflammation, and debility with reaction or fever, are produced by pressure also.

Looking at the condition of the heart or mass in dilatation with hypertrophy, then, we see the condition of the capillary or molecule in inflammation—the condition of the system in fever.

An appeal will now be made to individual facts and minor generalizations, in support of the truth of our major premiss—that all pathological phenomena are produced by pressure—and in making this appeal, it will at the same time appear that inflammation, fever and hypertrophy have the same antecedents or cause; and that the terms debility, dilatation, congestion or obstruction, are used indiscriminately as marking the antecedents or cause; while increased action will be seen to be marked by the terms reaction, inflammation, fever and hypertrophy. To these points we solicit particular attention.

Hope on the heart, page 252.—"It may be said, generally, that when *congestion* is *constant* in a cavity, dilatation is more commonly the result; and that when there is only resistance to the expulsion of the blood without constant congestion of the cavity, it is more common for hypertrophy to be produced.

Contraction, for instance, of the aortic orifice, causes hypertrophy of the left ventricle in a greater degree than dilatation ; whereas, patescence of that orifice, attended with regurgitation and constant engorgement of the cavity, causes dilatation in a greater degree than hypertrophy."

Jones' *Ohthalmic Medicine and Surgery*, page 59.—"Retardation of the flow of blood in the small vessels, coincident with dilatation of their calibre, and *accumulation*, and at last stagnation of the blood corpuscles in the vessels, constitute the first phenomena, constantly appreciable by the microscope in the inflammatory process as seen in the frog. The *macroscopical* phenomena of inflammation in man, being similar to those observed in the frog, seem to warrant the inference, that the *microscopical* ones also are essentially the same in him as in the frog. The explanation of these phenomena, therefore,—their sequence and relations—is justly considered the key of the whole theory of inflammation.

That the *dilatation* of the small vessels is primary, and the retardation of the flow of blood in them is secondary,—the necessary physical result of the preceding *dilatation*—is the opinion of most recent authors."

Tweedie's *Library Practical Medicine*, pages 168-9. General doctrines of Fever, by Christison. "If we wish to advance a step farther, and tread in the regions of hypothesis, then it seems a reasonable doctrine, that the primary disturbance of the functions of the nervous system acts first on the capillaries or extreme vessels of the surface, as well as throughout the internal organs, and produces, not spasm, as was imagined by Hoffman and Cullen, but rather, according to Modern views of the state of the capillaries in inflammation, a state of atony, relaxation, and distension, and consequently obstruction to the passage of the blood ; that the disturbed state of the circulation is an effort excited by the stimulus of this *obstruction* for accomplishing its own removal."

Cullen's *First Lines*, page 37.—"It is, therefore, evident that there are three states which always take place in fever : a state of *debility*, a state of cold, and a state of heat ; and as these three states regularly and constantly succeed each other in the order we have mentioned them, it is presumed that they are in the series of cause and effect with respect to one another. This we hold a matter of fact, even although we should not be able to explain in what manner, or by what mechanical means these states severally produce each other."

Cyclopædia Practical Medicine, vol. 3, page 556. Art. Plethora.—“We have stated that absolute plethora was the parent of pure inflammation. * * Previously to the occurrence of febrile or inflammatory action, there is always a sensible interval of disease marked by diminished power in the arterial system, the oppressed and irregular actions of which evince its inadequacy to carry on the circulation with its wonted vigor. The pulse, if examined, will be found low, oppressed, irregular, which state passes progressively into one of *increased action* or *fever*. Multiplied observations have satisfied us both that the stage of disease here mentioned precedes that of febrile action, and that the morbid actions indicated by the pulse succeed each other in the order here mentioned, the first being that of *feebleness*, the second of *irregularity*, and the third of *permanently quickened action*.”

Williams' Principles of Medicine, page 161.—“When a congestion is extensive, it has constitutional as well as local effects. In proportion as blood *accumulates* in a part, it leaves the rest of the body with less than its proper share, and the limbs and surface generally may show various symptoms of weak circulation and want of blood. Thus, with considerable congestion of the lungs, liver, or brain, the surface is pallid and chilly, the pulse weak and small, the extremities cold, there is a peculiar feeling of languor or uneasiness, and all the functions are indifferently performed.—Such an effect on the system may be produced artificially, by applying a tight bandage around both thighs at once, or even both arms in a weak person: The limbs beyond the ligature become congested, leaving a deficiency of blood in the rest of the system. The extreme of this condition is the cold fit of an ague, in which extensive internal congestions are the most essential pathological change. As in this example, so with other extensive congestions, more especially if suddenly induced, as by cold, a reaction may ensue causing quickened pulse and circulation, hot skin, and other phenomena of fever. Where this reaction is vigorous, it may fulfil its object in sweeping back the congested blood into the circulation, and thus restoring the balance. Where the reaction is weak, it will fail to remove the *congestion*, but constitutes a low feverish excitement, often remitting in type, with depraved functions, foul tongue, impaired secretions, restless nights, &c., which may proceed for an indefinite period, until a critical evacuation by sweat, urine, or diarrhea terminates it, and with it sometimes the congestion which has

induced it. In other cases there is no symptom of reaction." Ibid, page 163.—"The influence of stimulants on congestion may be illustrated by the microscope. A solution of capsicum applied to a frog's web, congested after previous irritation, causes an enlargement of the arteries, and an increased flow of blood to and through the congested vessels. This flow restores motion where it was deficient, sweeps away the accumulated blood, and, in some instances, causes the vessels to contract afterwards to their natural size; so that the congestion is completely removed—(eliminated); in that case, the cure is complete. In other instances, however, the stimulants fail to clear the congested vessels; the enlarged arteries pour in more blood, but this not overcoming the *obstruction*, increases the hyperemia, and as we shall afterwards see, may convert it into inflammation.

Thus it appears that stimulants, as well as astringents, although occasionally proving remedies for congestion, sometimes tend to increase it; and this they are most likely to do when the congestion is *extensive* or of *long continuance*, or when its causes are still in operation.

Under such circumstances, congestion is better relieved by another class of remedies—depletion, and various evacuants."

Watson's Practice, page 661.—"The physical cause (of hypertrophy) in nineteen cases out of twenty, is some obstacle, mechanical or virtual, to the perfect accomplishment of the function of the chamber; some *obstruction* opposed to the free and thorough exit of the blood from it; or something which hinders the easy play of the organ: hence, in the first place, a gradual yielding, or a tendency to yield, in the sides of the affected chamber, from the continual and unwonted pressure of the accumulated blood against them, and in the next place, a *striving* action [reaction] of the muscle to overcome the hindrance or to counterbalance the obstacle; and consequently, according to the law formerly announced, an augmentation in the bulk of the muscle whereof the function is thus *increased*. If the hypertrophy, which is the result of a truly conservative process, keeps pace exactly with the amount of the obstacle, and exactly balances it, no dilatation happens, or next to none. But this is comparatively seldom the case. According to the principles of mechanics, a little distension of the spheroidal cavity must require an increase of force to propel from it a given quantity of blood, in the same time, through a given discharging orifice. So that incipient *dilatation* becomes (in addition to the supposed obsta-

ele) an efficient cause of hypertrophy : and the two, the dilatation and the hypertrophy, commonly make progress together."

Stille's Pathology, page 430.—"This determination of blood forms the first step in the true inflammatory process, and, in a greater or less degree, precedes hypertrophy, atrophy, and many forms of hardening, softening, and transformation of the several tissues. Not that congestion is demonstrable, or can be proved necessary, in every instance of structural lesion, or that its connection with the lesion produced can always be explained ; this process, however, does precede the development of many organic changes, apparently unlike, and even the opposites * of one another, and is therefore often assumed to have been present, after the development of the consequences to which it usually gives rise."

Watson's Practice, page 41.—"I say the blood may undergo important alterations in its *quantity*. It may exist in too great abundance throughout the body ; and it may exist in too great abundance in certain parts only of the body.—These states have been recognised for ages. Sometimes they are called respectively general and partial *plethora* : Sometimes general and local *congestions* of blood ; people speak also of irregular *determinations* of blood to different organs ; and, of late, the term *hyperemia*, first invented by M. Andral, in France, has been imported into this country, and much adopted here. All these words and phrases, mean, in truth, the same thing ; and their frequent recurrence in Medical Works, is, of itself, sufficient evidence of the frequency and importance of the conditions which they express.

If we comprehend rightly this subject of plethora or congestion, we shall be prepared to understand some most important morbid states, of which it seems to be in many, if not in all cases, the earliest approach—the initial step. Inflammation, hemorrhage, dropsy, all acknowledge and imply a previous condition of congestion." Ibid, page 115.—"If the word congestion had not a local meaning (as connected with inflammation) Kaltenbrunner says, that we might call fever, a general congestion."

Wood's Practice, vol. 1, page 79.—"A patient in the first, or forming stage of a febrile disease, is not in a state of fever. As well might we say, that a part whose actions are violently depressed by the sedative influence of cold, is in a state of

* Compare this extract with the extract from 'Bird's Natural Philosophy.'

inflammation, because inflammation takes place when *reaction* ensues. The general depression which often ushers in fever, bears to it the same relation as the local depression bears to the subsequent inflammation. In the first case, the patient may die, and in the second case, the part affected may die, before reaction; and then neither fever nor inflammation will be established."

Alison's Outlines of Pathology.—"And if the local inflammation, which can be ascertained to take place during fever, is inadequate to explain the characteristic typhoid symptoms, it is equally in vain to seek an explanation of these symptoms, as some have done, in the mere circumstances of irregular distribution and congestion of blood.

Even the peculiarities of that form of fever which has been described under the name of *congestive*, are not to be explained by the mere circumstances of internal congestion, the existence of which, in the vessels, and especially in the veins of internal parts, in these circumstances, is admitted. For, although congestion or stagnation of blood within the cranium may be held to be a sufficient cause of stupor, yet we are so far from regarding congestion in the great veins leading to the heart as a sufficient cause for deficient action there, and consequent feeble pulse and cold skin, that we have already stated the accumulation of blood in the *great veins* to be apparently the chief cause of the *increased* action of the heart, or the *reaction* in the more usual form of fever."

Treatise on Fever, by Clymer, &c., page 32-34.—"Fever runs a determinate course, a paroxysm consisting of several stages. There is, 1st, the Formative or Precursory stage; 2d, that of Invasion; 3d, the period of Excitement; 4th, the stage of Crisis; 5th, that of Decrement, or Decline; and 6th, that of Convalescence.

A. The Formative or Precursory stage, the Latent Period, the stage of Incubation of the French, the Dormant Period of the English writers, was accurately described by Celsus. It would appear to be the result of the action of the exciting causes of fever on the animal frame. The earliest manifestations of the morbid impression are exhibited by the nervous system, and consists in general of languor and depression, with uneasy feelings; impairment or abolition of the natural appetites; and alteration in the secretions. The duration of this stage varies from twenty-four hours to several weeks. Its duration is said to be in inverse proportion to the severity and duration of the subsequent attack.

The subsequent stages are thus described by Dr. Copland :

“ B. Stage of Invasion ; (a) The cold stage of writers is attended by debility, lassitude, painful uneasiness, or sinking at the epigastrium, a sensation resembling cold running down the back, with formication or chills extending over the limbs and general surface. The pulse is constricted, small, weak, or accelerated ; the respiration is slow, irregular, or suspirious, and attended by anxiety at the precordia, and occasionally by a slight dry cough. On these supervene gaping, sighing, pandiculation ; a sense of weight, pain, or constriction in the head ; giddiness, moroseness, depression of spirits, and disorder of the senses ; lividity of the lips and nails ; pallor of the skin ; the cutis anserina, and shudderings, rigors, or shiverings, followed by, or alternating with, irregular flushes. After the rigors cease, a sense of chillness often continues for some time although the skin has become hot. These symptoms present various grades and modifications in the different types of fever ; in some the feeling of cold is actually attended by reduction of the temperature, and in others the heat is not materially, if at all, diminished, or it is even increased. The former is most commonly seen in the cold stage of periodic fever, the latter in the invasion of continued fevers. In all, however, the cutaneous transpiration is altogether arrested, and the skin is dry and harsh. The pulmonary exhalation is also diminished, and the breath is cold.— Copious discharges of pale urine often take place, evidently arising out of the arrest of the exhalation of the skin and lungs. Loss of appetite, costiveness, thirst, and occasionally sickness and vomiting, are likewise present. (b) The *duration* of this period may be very short, or it may be for many hours alternating with slight flushes. The shorter and more intense it is, and the severer the rigors, the shorter and severer will be the consequent vascular reaction, and the more nearly approaching the inflammatory type ; and the *longer its duration*, the more prolonged will be the fever. The imperfect evolution of this stage, or its slight occurrence, particularly when it is not attended with rigors, very generally indicates a severe malignant or typhoid state of disease. In some of the most dangerous cases of fever, I have seen this stage so slight as to be confounded with the preceding one. (c) The pathological states of the first period are increased in this, particularly the general depression of vital endowment ; the impeded functions of the lungs, liver, &c. ; the interrupted exhalation and secretion, excepting the urinary

secretion ; and the imperfect depuration and arterialization of the blood. But the lowered vital powers become more centralized, and the congestion of the large vessels, especially those of the thoracic and abdominal viscera, greater ; conditions which terminate themselves by inducing rigors, shivering, vomiting, and reaction of the vascular system, with the subordinate phenomena of the next stage."

Williams' Principles, page 150.—"The chief causes of *congestion* may be classed under these two heads : 1st, those of venous *obstruction* ; and 2nd, those of *atony* of the vessels, (capillaries and veins)."

Hope on the Heart, page 293.—"The causes of dilatation, are, 1st, *deficient power* of the heart, whether congenital or acquired, in proportion to the system ; 2nd, in general terms, all *obstructions* to the circulation, whether situated in the orifices of the heart, or in the aortic, or pulmonary system.—The second class of causes is, in fact, essentially the same as the exciting causes of hypertrophy, independent of inflammation. For, as stated under hypertrophy, it depends on the proportion which the resistance of the muscle bears to the distending force, whether the one affection or the other be produced. When, therefore, dilatation occurs in one of the cavities with naturally thick walls, in which we should more properly expect hypertrophy, it must be ascribed, either to a congenital disproportion of the heart, in consequence of which the cavity in question is thinner, and therefore more disposed to dilatation, than natural ; or it must be attributed to the obstruction, from its nature or situation, bearing more in proportion on that particular cavity than on any other. It is from overlooking these considerations, respecting the *relations of the resisting and distending forces to each other*, that some have excluded dilatation from the catalogue of *mechanical* diseases, and supposed that it takes its rise in any cavity of the heart, either by chance, or by some vital predilection, some vague, unintelligible predisposition."

Williams' Principles, page 150.—"Excess of blood in a part, with motion diminished—congestion ;"—that is, dilatation. Page 195.—"Excess of blood in a part, with motion partly increased, partly diminished—inflammation ;"—that is, dilatation with hypertrophy, the motion being diminished by the dilatation, and increased by the hypertrophy.

Treatise on Fever by Clymer, &c., page 48.—"[His (Brown's) theory differed, however, in no essential respect from that of his master, (Cullen). "Like his prede-

cessor," says Dr. Smith, "Brown attributes all fevers to debility; and affirms that the distinctions which physicians have made about the differences of fever are without foundation; that they are all the same, differing only in degree; that the debility during the cold state is the greatest; that of the hot less; that of the sweating stage, which ends in health for a time, is the least of all; hence, in a mild degree of the disease, as cold is the most hurtful power, its effect is gradually taken off by the agreeable heat of the bed or of the sun, and the strength thereby gradually drawn forth; that the heart and arteries gradually excited by the heat acquire vigour, and at last, having their perspiratory terminations excited by the same stimulus, the most hurtful symptom is thereby removed, the hot fit produced, and afterwards the same process carried on to the breaking out of sweat; that the cause of all these diseases, from the simplest and mildest intermittent to the goal fever and the plague, is the same with that of diseases not febrile, to wit, debility; differing only in this, that it is the greatest debility compatible with life, and not long compatible with it."

Ibid, same page.—"The views entertained, and so long taught by our distinguished countryman, Dr. Benjamin Rush, may not inappropriately be noticed here. We shall borrow the excellent analysis of them by the learned editor of the American edition of Dr. Copland's Dictionary. "As Dr. Rush confined the whole catalogue of diseases to a single class, and called the whole assemblage a *unit*, so also he reduced all fevers to one, maintaining that they differed only in *degree*, and that every form or variety of disease consists in *irregular action*, and that this irregular action, in its turn, is the approximate cause of every form or modification of disease. All the varieties of disease, according to his system, are owing to the difference in the state of predisposition, and in the difference in the force of the exciting or acting causes.

"Rejecting that part of Brown's doctrine which teaches that debility, carried to a certain degree, is disease, whether occasioned by the abstraction of natural and customary stimuli, or by their excessive action, exhausting or expending excitability—which, in the former case, Brown called direct debility, and in the latter, indirect debility; and which he supposed required the application of stimuli of very different powers to restore the deficient excitement to a healthy grade—Dr. Rush held that debility, whether induced by the abstraction of stimuli, or by the excess of their action, is the

only predisposing cause of disease. In both cases he supposes the debility which gives the predisposition to disease, is occasioned either by causes that abstract the stimuli necessary to support the healthy action of the several functions of the body (and the debility from these causes he calls the debility of abstraction), or by such preternatural or unusual stimuli as, after first elevating the excitement of the system above its healthy grade, and thereby wasting part of its strength, afterwards reduce it down to that state of debility which he calls the debility of action. And he considers the debility to be the same, whether brought on by the former or the latter causes ; for the effect is an increase and accumulation of excitability, or an increased disposition to motion in both cases, and disease, or irregular action, the necessary consequence of the action of stimuli upon the excitability thus generated and accumulated. To apply these views to the subject of *fever* ; as in health there exists a constant and just proportion between the degrees of excitement and excitability, and the force of stimuli, so in a predisposition to fever, as well as all other diseases which consist in debility and undue proportion of excitability, or preternatural disposition to motion, the ratio between the force of stimuli, excitement, and excitability is destroyed ; in consequence of which the stimuli act with a force which produces *irregular action*, or in other words, *fever* ; and when the excitability is comparatively more abundant in the blood-vessels than in the other portions of the system, which, from their being distributed in numerous and minute branches to every part of the surface of the body, both internal and external, is frequently the case, morbid, or irregular and convulsive motion is produced in them by the stimulating action of the circulating blood ; for the equilibrium of the system being destroyed by the sudden abstraction of excitement, in consequence of the suspension of the natural and customary stimuli, the blood becomes unequally distributed, and, by acting with an increase of quantity and force in parts not accustomed to either, becomes an irritant to the muscular fibres of the blood-vessels, and thus an exciting cause of fever. When the excitability is redundant, and the natural or customary stimuli continue to act, the disease exhibits symptoms which indicate too much strength or activity, but more predominant in that portion of the system in which it has become comparatively more abundant than in the other portions of the same ; and when it is deficient the symptoms indicate too little strength

and activity in the system, and particularly in that portion of it in which the excitability is comparatively more defective than in the other portions ; and when either the quantity of the excitability or the force of the stimuli is in an undue proportion to each other, different degrees of excitement or power of action are the consequence. Rush maintained, moreover, that all the remote or predisposing causes of fever, and all other diseases, are *debilitating*, and all the occasional or exciting causes *stimulating*. Among the remote or predisposing causes of fever he enumerates cold ; the debilitating or depressing passions of fear, grief, &c. ; immoderate evacuations ; famine, &c. ; all of which induce debility, or a diminution of healthful power, by the abstraction of customary and salutary stimuli, in consequence of which the excitability accumulates and becomes redundant.

Among the causes which predispose to fever by the excessive or unusual application of stimuli, he mentions heat ; intemperance in eating or drinking ; inordinate exercise ; violent emotions ; marsh and human miasmata ; contagions and poisons of all kinds ; bruises and burns, &c. : all of these he supposes to act, by their stimulating power only, in the production of fever, although he admits that fever is frequently the consequence of the debilitating effects of the remote causes, without the application of any apparent stimulus, the circulating blood being sufficient, in such a state of excitability, to stimulate the arteries, and by producing *irregular action*, cause fever. 'Reaction,' says Dr. Rush, 'is thus induced, and in this reaction, according to its greater or less force and extent, consist the different degrees of fever. It is of an irregular or a *convulsive* nature. In common cases it is seated primarily in the blood-vessels, and particularly in the arteries. These pervade every part of the body. They terminate upon its whole surface, in which I include the lungs and alimentary canal as well as the skin. They are the outposts of the system, in consequence of which they are most exposed to cold, heat, intemperance, and all the other external and internal, remote, and exciting causes of fever, and are first roused into resistance by them.' In bringing about reaction of the blood-vessels, in which fever consists, Dr. Rush rejected the *vis medicatrix naturæ* of Cullen, and attributed it altogether to their elastic and muscular texture, being 'as simply mechanical as motion from impressions upon other kinds of matter.'* According to Rush, then, there is but

* Medical Inquiries and Observations. By Benj. Rush, M. D., Phila., 1809. 4 vols.

one fever, and one exciting cause of fever, namely, *stimulus*.—The phenomena of fever resolve themselves into a chain, consisting of the five following links: 1. Debility from action, or the abstraction of stimuli. 2. An increase of their excitability. 3. Stimulating powers applied to them. 4. Depression. 5. Irregular action or convulsion; all the links being only perceptible when the fever comes on in a *gradual* manner."

Druitt's Surgery. 1st Chapter.—"The process of recovery from *collapse*, is commonly *reaction*; and the manner in which the case may terminate must depend on the nature and degree of that reaction. Thus, first, if it is healthy and moderate, and especially if the collapse arise merely from concussion (or violent shaking) of an organ, without actual injury to its structure, it will lead to complete recovery.

Secondly, If reaction be excessive, the state of collapse will be gradually *succeeded* by *fever*, symptomatic of the inflammation to which the local injury has given origin. * * If reaction be altogether wanting the collapse will terminate in death."

Cyclopaedia, Practical Medicine, vol. 1, page 456.—"But the injury sustained from exposure to cold is not always dependent on its direct sedative influence, for it may produce disease, and even cause death, by that secondary effect which is denominated *reaction*. This reaction *after* depression consists in the return of the action of the vascular system; if moderate, it may go little beyond the natural degree; but when the reaction is great, the vascular excitement is so increased beyond due bounds as to constitute *fever*; and perhaps there may be in reality no difference between this state of the body and fever from other causes. The symptoms are often the same, and sometimes last as long. * * Fever is not the only consequence to be feared from reaction after exposure to cold; local inflammations may follow this general reaction, and any of the internal organs or membranes may become the seat of the inflammation; but the particular organ affected in each case may be determined by some local predisposition; thus one person will have catarrh, another cynanche tonsillaris, a third pneumonia, as a consequence of exposure to cold."

Cyclopaedia, Practical Medicine, vol. 1, page 467.—"The most frequent and obvious cause of coma, is pressure on the brain. A state of perfect coma can be produced artificially by applying pressure to the brain of an animal, and the coma

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is relieved the moment the pressure is taken off. The brain is exposed to pressure from a variety of causes. The principal of these are, *congestion, inflammation, effusions* of blood, pus, or serous fluid, organic tumors seated in the brain, in its membranes, or on the parietes of the skull, fractures of the skull, with depression, &c."

Wood's Practice, vol. 2, page 167.—"The causes of hypertrophy and dilatation, are often the same, though acting upon different principles. Whatever stimulates the muscular action of the heart may produce the former affection, whatever has a tendency to distend the walls may produce the latter. Now no *stimulus* is greater probably to the muscular fibres than the *pressure of the blood* within the cavity they surround, and no cause tends more strongly than *this* to produce distension."

If we take from inflammation, fever, and hypertrophy, the condition which they have in common—increased action—nothing will remain to which these terms are applicable.—This common condition, must have a common cause; therefore, they are illustrative of each other. Sometimes we have no reaction; sometimes we have no hypertrophy; the cause and effect, in each, are the same. Sometimes we have a low form of inflammation, of fever; this is represented in dilatation with hypertrophy, dilatation, predominating. Sometimes we have active inflammation, active fever; this is represented in hypertrophy with dilatation, hypertrophy, predominating.

As dilatation with reaction or hypertrophy, and congestion with reaction or fever, are produced by the same cause, and as dilatation with hypertrophy of the heart, and *fever*, involve the system at large, it follows that the symptoms in each should be the same; and by reference to dilatation and dilatation with hypertrophy of the heart, the list of symptoms which occur in fever—in all fevers—will be seen to be exhausted.

One more illustration which creeps to the verge of the Record, and we pass to our final confirmation. From the earliest records of Medicine, inflammation, and fever, have been considered, Conservative; hypertrophy, which has only been understood since the discovery of the circulation, has been considered, Conservative, also; and all for the same reason—that without reaction, the congestion, ague, or dilatation, invariably terminated in death; that with reaction, whether it amounted to inflammation, fever, or hypertrophy, or not, a

large majority recovered, or life was protracted; hence it was very natural to look upon inflammation, fever, and hypertrophy, as conservative.

We will now institute an Experiment, and return back upon the preceding facts and minor generalizations, in Verification.

Dilatation, or valvular disease, being an obstruction to the circulation, whenever an organ through which all the blood of the body passes, as the heart, becomes affected, it must obstruct the return of blood from all parts of the system, thus producing general congestion—increasing the pressure of blood upon all parts of the system—and therefore, according to our major premiss, should produce all pathological phenomena*—hypertrophy, which is increased action—increased pressure, giving prominence, *activity* to those phenomena.

Hope on the Heart, page 300–302.—“In the preceding section I have shown that the effect of dilatation is, to *enfeeble* the heart, and thereby occasion the phenomena of an *obstructed* circulation. We have now to examine those phenomena as signs of dilatation.

General signs.—The heart when weakened by dilatation, is subject to palpitations of a feeble, oppressed kind, and more or less distressing, frequent, and prolonged, according to the extent of the malady. In general they are protracted. The attacks are provoked by any over-exertion or mental excitement. The pulse is soft and feeble, and, if the debility of the heart be very considerable, it is small. Irregularity and intermittence are rare, except during protracted and distressing paroxysms of dyspnea, or when the vital powers are much exhausted, as in the advanced stage of the disease.—When, however, softening accompanies the dilatation, I have found that the pulse is apt to be as small, weak, intermittent, irregular and unequal, as in the worst cases of disease of the mitral valve, with which, for this reason, softening is frequently confounded.

The languor of the arterial circulation in dilatation causes the extremities and surface to be *chilly*, the disposition to be melancholy, and the character to be deficient in energy.

The blood, not being freely transmitted by the left ventri-

* It must be borne in mind that we are not required to produce all the Names which have been applied to what are called special diseases, since those Names do not always go down to states. For instance: We cannot produce the name, Small Pox, but we produce congestion, inflammation, fever, ulceration and mortification, and if these are taken from Small Pox, or any other *specific* disease, there will be no remainder.

cle, accumulates in the lungs by retardation : whence difficulty of respiration : cough, sooner or later, attended, in many cases, with copious expectoration of thin serous mucus ; œdema of the cellular tissue of the lungs, greatly aggravating the dyspnea ; terrific dreams with starting from sleep ; and passive, pulmonary hemorrhage of dark, grumous blood in small quantities, forming sanious sputa, and generally the precursor of death in individuals affected with great difficulty of respiration. After death, I have often found this hemorrhage connected with pulmonary apoplexy, and always with great engorgement.

The Lungs being *obstructed*, the engorgement is propagated backward to the right side of the heart, to the *great veins*, and finally to *all their ramifications*. From this *Venous engorgement*, arises a series of striking phenomena, which we shall review successively, premising that the hemorrhage and dropsy do not generally come on till a *late stage* of the disease.

1st. *Serous Infiltration*.—This generally makes its appearance first in the lower extremities, because it is in them that the circulation is most languid, the return of blood being opposed by its gravity, while it is little promoted by the action of superincumbent muscles. The œdema gradually ascends, and under the name of anasarca, may eventually attain the utmost degree over the surface of the whole body. Increased serous exhalation takes place from the serous membranes also ; whence hydrothorax, hydropericardium, and ascites ; one or other of which is almost invariably present when there is much external dropsy.

2d. *Discoloration of the Face*.—If the complexion was originally florid, it becomes purple or deep violet, on the centre of the cheeks, the end of the nose, and the lips, with intumescence of the latter, while the intermediate parts are palid and sallow. If originally pale, it becomes cadaverously exsanguine, and has a dusky, leaden, or venous cast, especially around the eyes. The lips are either livid or very pale. Lividity sometimes shows itself in the extremities as well as in the face.

3d. *Congestion of the Brain*.—This produces the usual symptoms of passive cerebral congestion, and of the corresponding form of apoplexy, namely : dull head-ache, felt principally along the great sinuses ; hebetude of the mental faculties ; stupor, convulsions, and eventually complete coma. It is not unusual for these symptoms to supervene a few days

before the fatal termination. Sometimes, they depend, not on congestion alone, but partly also on serous effusions into the ventricles, or on the surface, resulting from the congestion; sometimes, again, the congestion ends in sanguinous apoplexy, of which I have seen several instances. Whence it is incorrect to suppose that this catastrophe is peculiar to hypertrophy of the heart:

4. *Injection of the mucous membranes.*—It is common to find them after death so vascular as to present the appearance of inflammation. This is especially the case in the stomach and intestines; and it is necessary to be aware of the circumstance, in order to guard against the error of attributing the redness to inflammation.

5. *Passive Hemorrhage.*—This takes place from the lungs as already stated; also from the nose, the stomach, the intestines, the uterus, and more rarely from the bladder. It results from the engorgement of the mucous membranes. The effusion consists of dark blood, exuding in small quantities. When from the stomach, and not immediately ejected, it has occasionally the appearance of coffee grounds, in consequence of being exposed to the coagulating action of the gastric juice. In the intestines it is often blackened by the intestinal acids—the carbonic, acetic, and sulphuretted hydrogen.

6. *Congestion and enlargement of the Liver.*—This is so common a consequence of retardation of the blood on the right side of the heart, that few persons so effected in any considerable degree are exempt from it. This has, I believe, been almost entirely overlooked by authors on the diseases of the heart, and is still very little known. By the obstruction which it occasions in the system of the vena porta, it leads to ascites and jaundice; also eminently favors hematemesis, intestinal hemorrhage, piles, and, though indirectly, uterine hemorrhage—many cases of which I have found to be obstinate till the hepatic enlargement was reduced by mercury and aperients. This latter fact has been noticed by Dr. Locock:

7. *Angina of the heart may occur as an adventitious complication of dilatation, no less than of hypertrophy.*—To the above list, Dr. Wood adds (Wood's Practice, 2d vol., page 162,) dyspepsia, nausea and vomiting; constipation, diarrhea, melena, albuminuria, and delirium. Dr. Carswell and others, add ulceration and mortification; and so on to the end of the chapter—Dr. Hope adding (page 252) increased action, reaction, inflammation, fever, that is, hypertrophy;—therefore,

we feel authorized to assert our Major Premiss proven—to assert that All pathological phenomena are produced by Pressure—that Disease is a UNIT—Medicine, a SCIENCE.

The argument concluded, a few observations will be offered on the cause of the Diversity exhibited by pathological phenomena ; after which, some remarks will be made upon "principles of treatment" in illustration—Elimination.

In the preceeding quotations, the list of special diseases or the diversity of pathological phenomena, have passed in review, as arising from congestion—from pressure ; and as well increased action, or inflammation, fever and hypertrophy, as dropsy or hemorrhage, convulsion or coma. The same reason which constitutes congestion or pressure of blood, the cause of hemorrhage, flux, and dropsy, constitutes congestion, the cause of inflammation, fever, and hypertrophy, namely: That it is the invariable antecedent and coexistent of each—of all.

From the long duration of dilatation of the heart, from the extent of surface involved, and from the slow and gradual manner in which congestion extends from part to part, from organ to organ, increasing in degree until all are involved, we have time and opportunity to see that all the diversity exhibited by pathological phenomena, depend upon *extent, degree and duration* of congestion, of pressure. We there see, that every phenomenon which accompanies increased action or fever, occurs from congestion, or pressure, without fever,—occurs in the chill. In other words, as congestion precedes, enters into, coexists with, and is the cause of fever, it is the cause of all the phenomena which attend fever,—bearing in mind that *increased action* is increased *pressure*, converting what was before called *passive*, into what is now called *active* disease—but adding nothing new, in kind, to the passive phenomena. We repeat, that in dilatation or a chronic chill, we have *time* to see all this ; and we there see every symptom which ever occurred in any fever, in every fever, in all fevers. Take for instance, that dreadful scourge known as, 'Yellow Fever,' and on reference to that chronic chill—

Dilatation of the heart—we see every essential or characteristic symptom,—the pain, stupor, delirium, convulsion, and coma; the leaden, purple, and jaundiced skin; the hemorrhages, and the black vomit—requiring only a little increased action, a little hypertrophy, to render the portrait complete.

To say that no two cases of fever exhibit the same phenomena in every respect, is simply to say, that all the conditions, local and general, are not the same; is to say, that there is not the same extent, degree, and duration of congestion, of pressure; since it is this which determines the increased action itself, the degree and duration of that action. The reason, then, why congestion is not always followed by increased action, is, that if the congestion passes a certain degree, the solids are paralysed; it depends upon the degree of pressure—"the proportion which the cause bears to the reacting energy of the cavity exposed to its influence, whether dilatation, or dilatation with hypertrophy, be established:" and the reason why congestion with reaction does not always develope the condition known as inflammation, fever, and hypertrophy, is, that sometimes the reaction sweeps out the congestion, and then the increased action subsides, its cause having been removed, before there was *time* to develope the condition recognised as inflammation, fever, or hypertrophy. We saw an illustration of this in a previous extract from Dr. Williams. We there saw that if the increased action excited by stimulants, removed the congestion within a certain time, the condition recognised as inflammation was not established; but that if, from extent or duration of congestion, the increased action failed to remove it within a certain time, then the condition recognised as inflammation was developed. A more moderate degree, and longer duration, of congestion with reaction, and, hypertrophy, ensues. *

* Cyclopaedia, Practical Medicine, vol. 1, page 316.—"The effects of pressure have often been examined by experiments on animals. If the cranium of a dog is trepanned and pressure made on the dura mater to a *certain extent*, the animal shows signs of great uneasiness, and is affected with general convulsions; if the pressure be *increased*, the convulsions cease, the breathing becomes stertorous, the animal torpid and comatose; if the pressure is *diminished*, the breathing becomes more free, and the convulsions return; and if it is entirely *removed*, the animal soon completely recovers. The principal causes of pressure are *congestion, effusions, &c.*—Ibid, page 317.—"A high stage of congestion, either general or local, precedes inflammation. General congestion may cause death, either by compression or extravasation of blood, before there has been *sufficient time* for the developement of inflammation. Local congestion is seldom so rapidly fatal, and time is afforded for the inflammatory process to go through its different stages."

Hope on the Heart, page 247.—"According to the foregoing opinion on the mode of formation of hypertrophy, it will be apparent that every circumstance capable of

A dozen men are exposed to cold :—one has pneumonia, a second rheumatism, a third cholera, a fourth pleurisy, a fifth dysentery, a sixth, catarrh, and the remainder exhibit no appreciable morbid change. What, now, is the cause of all this diversity? It certainly cannot be in the cold, since all were alike exposed. The co-operating or determining cause must be sought in the state of the body, in the state of the organs, at the time of exposure: it is the state of the *body*, the state of the *organs* at the time, that determines who, and what organs, will most prominently suffer; and as long as there are differences in the bodily states of different individuals, and differences in the state of the different organs in the same individual, so long must there be diversity in the phenomena exhibited. To say that cold was the cause of all this diversity, independent of states of the body or states of the organs, would be like saying that because a man's actions or character were *influenced* by external circumstances, therefore those external circumstances were the cause of the diversity of action or character exhibited by individuals, independent of states of the Mind: Whereas, those states of the mind, our sensations, volitions, hopes, fears, desires, and experience, are as substantial conditions or causes of the diversity exhibited by individuals, as are external influences. It is the co-operation of all the conditions which must determine the result; and therefore, a case of causation, is not fairly stated, unless all the conditions are brought in.

If the vascular apparatus of every man was in the same tone throughout, if all the conditions, local and general, were the same, we would have a right to presume that there would be no diversity in the phenomena exhibited; but this is not so; hence the diversity exhibited by different individuals, and by the same individual at different times. One man may have a more general or greater degree of congestion, in fever, than another, and consequently, exhibit greater diversity of phenomena.

That increased action, inflammation, fever, or hypertrophy, increasing the action of the heart for a *sufficient length of time*, may be a cause of hypertrophy."

Wood's Practice, vol. I, page 90.—"It has been before stated, that a slight disorder of the functions, vanishing almost as soon as it occurs, can scarcely be accounted disease. This is true of the whole as well as of a part; and a general derangement of the system, in order to constitute fever, must have a *certain duration*.

Mills's System of Logic, page 501.—"One of the conditions oftenest dropped, when what would otherwise be a true proposition if employed as a premiss for proving others, is the condition of *time*."

is increased *pressure*, and that it returns back upon the antecedent passive phenomena, converting them into *active* phenomena, is well seen in the following quotation from Hope on the Heart, page 255 :—"It must be admitted, however, that hypertrophy does not produce serous infiltration so readily and promptly as a direct, primary obstacle to the return of the venous blood ; a fact which admits of a rational and obvious explanation. When there is an obstacle to the return of the venous blood, suppose, for instance, contraction of the tricuspid, pulmonic, or mitral orifice, two causes conspire to produce the capillary congestion : namely, *the direct pressure of the arterial vis-a-tergo, and the retrograde pressure of the retarded venous blood.* But when the latter pressure does not exist, when the veins freely receive and transmit their natural proportion of blood, the force of the arterial circulation must be very greatly *increased* before it can so far overcome the elasticity of the capillaries as to give rise to engorgement and infiltration." *

Disease, being a unit—obstructed circulation—there is but one indication of treatment : namely, to remove the obstruction, to restore the circulation, locally and generally, to its normal state. All our remedial appliances are successful in proportion as they fulfil this indication ; and they do so, either by diminishing the pressure of blood, or increasing the pressure of the solids, or both. Depletion, in all its forms, whether by abstinence, blood-letting, or increasing secretion, operates by diminishing the pressure of blood : while exercise, bandaging, stimulants, tonics, astringents, &c., operate by increasing the returning pressure of the solids.

* It would seem from this extract, that increased action, or hypertrophy of the heart, could produce congestion of the capillaries without the antecedent retrograde pressure of venous blood. It was asserted in a former part of this Essay, that the "majority maintained the doctrine, that a state known as debility, dilatation, congestion, or obstruction, was an invariable antecedent of inflammation, fever, or hypertrophy ; while the minority held that this state was not an invariable antecedent ; that, although it always *co-existed* with inflammation, fever, or hypertrophy, yet, this co-existent dilatation, congestion, or obstruction, might be, and sometimes was, the direct result of the *increased action* of the part or system affected." The position advocated in the above extract is that of the minority spoken of,—but it will be seen by reference to Dr. Hope's explanation of the manner in which hypertrophy is produced, that the *existence* of hypertrophy *implies* an antecedent congestion or obstruction as its cause. The importance of this point, in its application to other subjects, justifies this explanation.

Taking the heart in illustration of the capillary, we may see the indication of treatment, and something of the *modus operandi* of remedies. We have seen that dilatation was produced by a 'relatively increased pressure of blood, to the returning pressure of the heart.' The obvious indication of treatment, then, is either to diminish the pressure of blood, or increase the pressure of the heart, or both. We may be said to do both when we prescribe abstinence and exercise, or blue pill to increase secretion, and follow it with quinine* to increase the returning pressure of the solids;—between the two, an equilibrium is established.

The next question to determine is, the degree and duration of dilatation; for, although the principles of treatment for acute and chronic disease, are the same, yet the *activity* of remedial appliances used, must be adapted to degree, and duration. For instance, if the congestion be chronic, an active treatment would not be admissible. The reason of this is appreciable, if we refer to dilatation, or dilatation with hypertrophy of the heart. No one would think of cutting short, these rooted affections, by active treatment. Duration, is an element in their formation, and, duration, an element in their removal. Like a rooted prejudice of the Mind, or a chronic disease of the Body Politic, they must be removed, after the manner of their formation—slowly, gradually, and gently, giving parts, or systems, *time* to accommodate themselves to the changes necessary to be made.

By violence we may destroy, in such cases, but cannot cure. A chronic remedy for a chronic disease, whether of Body, or Mind.

We have an illustration of this subject in the remedies known as Alteratives.

When an acute attack supervenes upon a chronic disease, so much of it as is acute, may be attacked vigorously; bearing constantly in mind, however, the chronic affair at bottom.

If it be an acute dilatation with hypertrophy—ague and fever—an active treatment may be admissible. Here, the congestion has not been of sufficient *duration* to have habituated the vessels to this state; consequently they may speedily return to their normal calibre or state, upon the removal of congestion or pressure, and the conditions of healthy circulation be speedily restored.

* Williams' Principles of Medicine, page 156.—“The efficacy of bark and arsenic in preventing, as well as in removing the internal congestion of ague, probably depends on their power of augmenting the tone of the vessels of these parts, so that they no longer yield to the dislensive accumulation of blood within them.”

We have a Portrait of the condition of the system, in ague and fever, in the following from Hope on the Heart, page 257.—“Obstruction in the right auricle, whether from this (obstruction in the lungs) or any other cause, presents an obstacle to the return of the venous blood, and therefore, causes retardation throughout the whole venous system.—Nor is this all : for the retardation is propagated through the capillaries to the arterial system, and thus returns in a circle to the heart. In this way is explained what at first sight appears an anomaly : namely, that the left cavities are sometimes rendered hypertrophous, by an obstruction in the heart situated behind them in the course of the circulation, as for instance, when the left ventricle is rendered hypertrophous by a contraction of the mitral orifice.”

The capillary circulation, being the antecedent, and base, of the circulation of the heart and large vessels, it follows, that obstruction to the capillary circulation is the antecedent in disease, the congestion of the heart and large veins, being secondary or an effect, but becoming in turn a Cause ; returning back upon the capillaries, increasing the congestion, or pressure of blood, in the capillaries ; and often, if not always, determining the fatal result.

If it be affirmed that dilatation of the heart may be *primitive*, that is, may occur from its own debility or deficient power, without any obstruction before it, as for instance,—obstruction in the lungs, operating backward upon the right ventricle—we reply, that this primitive deficiency of power in the heart itself, is owing to its own deficient capillary circulation. This point, is well illustrated in valvular disease. When the valves, are diseased, thus obstructing the general circulation, the point of departure is still in the capillary circulation—the capillary or molecular circulation of the valve itself. But, though the point of departure be in the capillary circulation, (be in individuals with relation to masses or governments) when the heart is obstructed by dilatation or valvular disease, we have time and opportunity to see and appreciate the vast importance of the Effect—the venous congestion :—we there see that the effect becomes in turn a Cause, that the accumulation of blood in the veins returns back upon the capillaries, increasing the congestion, or pressure of blood, in the capillaries, thus determining the occurrence, or giving Prominence to the phenomena which appear in dilatation or valvular disease of the heart. The dilatation or valvular disease, then, holds the relation to flux,

dropsy, hemorrhage, convulsion, coma, &c., of an *exp. artery* cause,—the proximate or determining cause of their manifestation—being venous congestion; the retrograde pressure of venous blood in the capillaries. It follows from this, that if there be venous congestion, it does not matter whether there be dilatation, or valvular disease of the heart; or not; the effect must be the same.

Let it not be said; then, that the venous congestion which is acknowledged to exist in a chill, in fever, in cholera, in all constitutional affections, in death, is merely an Effect; since in dilatation or valvular disease of the heart, we have time, and opportunity, to demonstrate it a powerful and all important co-operating Cause.

This retrograde pressure of venous blood in the capillaries, is the chief fulcrum of the increased force of the heart in fever; it is, as it were, a ligature to the ends of the arteries,—hence their throb.

From all which has been said, it appears, that the cause of acute congestion with reaction—ague and fever—becomes, from duration, the cause of chronic congestion with reaction, chronic, continued, or typhoid fever. The exciting cause is the same in kind, but in the development of what is called typhoid fever, it is less intense in degree, and operates through a longer period of time; the period of Incubation, is longer, and consequently, from extent and duration of congestion, the subsequent reaction fails to remove it within the time of an ordinary intermittent; and the intermittent repeats itself, as it were, thus becoming continued.

This is indicated in the fact, that sometimes a single mercurial cathartic, with quinine, fails to remove an intermittent or remittent, and the cathartic or other form of depletion, must be repeated again and again before quinine suffices to break up the conditions. Now, why do not these cases, like perhaps the majority of cases, yield to a single mercurial cathartic followed by quinine, and sometimes to quinine without a cathartic? We answer that, from extent and duration of congestion, the single cathartic with quinine fails to remove it, the cause of fever remains, and according to extent, degree, and duration of congestion, do we have intermittent, remittent, or continued fever.

Typhoid fever, then, compared with an intermittent, or remittent, is a chronic fever, because, compared with them, its cause is chronic, and; therefore, compared with them, its treatment must be chronic also.

The difference in the treatment of acute and chronic fever, is not of one kind, but in a chronic fever we diffuse the treatment over a larger surface, or extend it through a longer period of time; we *gradually* diminish the congestion or pressure of blood, in order that the *habituated* vessels have *time* to return to their natural state; and after the congestion has been diminished to a certain degree, we moderately stimulate the vessels to return to this state. In acute fever, we diminish the congestion suddenly, as by bleeding, or active mercurial cathartics, and immediately follow up the depletion with stimulants and tonics, as opium and quinine, and we may in this way, speedily restore the conditions of healthy circulation. Not so in chronic fever; here, when we deplete, we use a chronic bleeding, as by taking blood from a small orifice, and in comparatively small quantity at a time; or, we moderately increase secretion; or, what amounts to the same thing, we cut short the supplies; that is, prescribe Abstinence. Abstinence produces the same state *gradually*, that blood-letting, or increasing secretion, does suddenly; and as Exercise, is stimulant, is tonic, a prescription of abstinence and exercise must be admirably adapted to a multitude of minor ailments. It is a time-honored prescription, but is not very popular, and has fallen into unmerited neglect. It is not adapted, however, to every degree and duration of congestion, or congestion with reaction; it will not cure all cases, unless commenced in their incipency, and then it must not be carried too far; for, strange as it might appear, the action of all remedial appliances, become, when carried too far, causes of disease; that undue abstinence, is so, is seen in the effects of Famine, and over-exertion, ends in exhaustion—congestion. There is a due mean, a certain limit, to the salutary operation of all remedial appliances:

Again, as exercise is stimulant, it is not admissible in established congestion, or congestion with reaction. Here, by increasing the action of the heart or blood-vessel, pressure is increased, thus giving prominence—activity to the symptoms. In fact, Exercise, is increased pressure of the solids.—This is appreciable when we look at the increased action, increased *exercise* of the heart in fever. From this, we see the necessity, the utility, of confinement to the horizontal position; the necessity and utility of quiet of body and mind in fever. Like other stimulants, Exercise must be adapted to conditions.

Typhoid fever, being a chronic fever, requires chronic

treatment; that is, the cause of the fever—the congestion—from extent and duration, must be gradually and gently removed; and the form of depletion which seems best adapted to the generality of cases, is, Abstinence: and as in acute cases, we first deplete, and then give stimulants or tonics, so in chronic cases, after a longer or shorter time, according to conditions, we follow up the depletion with stimulants and tonics.

Heat, being a stimulant, the increased heat of fever, acts precisely as does any other stimulant: it increases the action of the heart, increases the arterial vis-a-tergo, thus increasing the pressure of blood in the capillaries, as we saw in hypertrophy. Hence the utility of cold or evaporating applications, in fever; since by diminishing heat, increased action, increased pressure, is diminished, thus mitigating the symptoms.

Abstinence, and cold water, are leading prescriptions in the treatment of fever, but depletion by abstinence is not sufficiently active in some acute cases, and we have to combine mercurial cathartics, or bleeding, with abstinence; and even in chronic fever, it is sometimes necessary, and useful, to deplete moderately the internal veins through the liver by mild mercurials, or take blood slowly, and in comparatively small quantity from the arm.

Large enemas of cold water, are admirable in the treatment of fever; they diminish heat, and consequently excitement; and by bandaging, as it were, the abdominal vessels, they diminish abdominal congestion, and thus mitigate or remove the diarrhea which is an occasional attendant, and which arises from the same cause, as the fever itself. Enemas of cold water are valuable in the treatment of diarrhea with or without fever, since it has, in all cases, the same proximate cause; but as is the case with all other remedial agents, an enema of cold water, alone, is not always sufficient, is not always adapted to all the conditions. Although agents act always the same under the same circumstances, yet there are no Specifics in Medicine, the conditions not always being the same, and the treatment must therefore be adaptive—adapted to extent, degree, and, duration of congestion—and combination of remedies, are frequently indispensable.

As with abstinence or depletion, so with the application of cold, if carried too far, if its application be too long continued, it produces congestion; like other remedial applications; then, there is a certain limit, to its salutary operation.

Unstimulating diaphoretics, as lemon juice or citric acid, and potash, are valuable adjuvants in the treatment of fever; by diminishing heat, increased action, is diminished, thus promoting a more equable distribution of blood.

With vitiated secretions, sordes, soft pulse and delirium, grain doses of calomel every four hours, with wine or wine and opium, are often productive of the greatest benefit.

Depressing Emotions, we have seen, are among the exciting causes of disease; and they operate as does excessive depletion, or the too long continued application of cold,—they produce prostration, congestion; hence the great utility of Cheerfulness, around the sick.

Cool, fresh air, to conduct off the heat of the external surface, and from that immense capillary surface, the lungs,—and to bandage the pulmonary vessels, and afford a good fulcrum for the expansion of the chest, is all important in the treatment of fever. By diminishing heat, increased action or pressure, is diminished, and by cooling and bandaging the pulmonary surface, it promotes a more tranquil and free circulation through the lungs, thus diminishing venous congestion.

Opiates, are of immense utility in removing internal congestion; but as they stimulate, they are not admissible in established congestion, or congestion with reaction, or fever, with dry hot skin, and hard pulse; here, by stimulating the heart, they increase the pressure of blood in the capillaries, and aggravate the symptoms; but, in low fever, with soft pulse, or in the early and late stages of fever, or in all cases after sufficient depletion, opiates are of the highest utility. There is probably no remedy of equal potency and power in removing the congestion of ague, from the mildest intermittent down to sudden collapse of cholera, with large doses of morphine. Given in doses of from half a grain to a grain, according to conditions, there is no remedy with which we are acquainted that so speedily and thoroughly uproots and removes it. Chronic congestion, however, is not thus speedily removed; here, depletion must precede and accompany stimulants and tonics. Nor is it pretended that all cases of acute congestion or congestion with reaction, can be removed by large doses of morphine; but it is asserted that in the majority of cases of acute ague, or cholera, large doses of morphine are potent and powerful, and that where they cure one case, they will cure all cases, the circumstances or conditions being the same. It is in the extent, degree, and dura-

tion of congestion, that we are to seek the cause of the apparent discrepancy in the action of remedial agents in different individuals, and in the same individual at different times.

As whatever is true of the circulation of the heart and large vessels, is true of the capillary circulation, we may have a minature of the condition of the system in fever, in any part; and of course with or without, general fever; and whether the local fever be primary or secondary, the local and general fever mutually act and react upon each other. The principles of treatment for the local, are the same as for the general fever; if the local congestion or congestion with reaction, passes a certain degree and duration, we first deplete as by cups or leeches, then apply fomentations or evaporating lotions, and afterwards apply stimulants or tonics, as blisters, bandages, &c.

Looking at the condition of the system in that chronic chill—dilatation of the heart—we have time and opportunity to enquire into the pathology of acute chill, congestive chill, or cholera.

It is a fact appreciable to the observation of physicians, that when congestion takes place slowly, effusions are more apt to take place into closed sacs, than upon open or free surfaces; that is, we are more apt to have dropsy, than diarrhea, or flux from mucous membranes: and it is also a fact appreciable to the physician, that when congestion takes place suddenly, we are more apt to have effusions upon free surfaces or mucous membranes, than into closed cavities or serous sacs. So closely are dropsy, hemorrhage and flux, connected, that to relieve the one, we have frequently, only to produce the other, showing clearly that the proximate cause of each, is the same.

It is a fact appreciable to the profession, that when congestion takes place slowly, it may attain to a degree, and produce effects, which would be incompatible with life if occurring suddenly: hence we could not expect to see the same extent and degree of congestion, and its results, in an acute, as in a chronic attack. In dilatation of the heart, we have chronic venous congestion, which venous congestion, and not

the dilatation of the heart, is the cause of flux, dropsy, hemorrhage, pain, convulsion, coma, and the long list of pathological phenomena. In ague, congestive chill, or cholera—acute dilatation—we have venous congestion, and although we have a multitude of pathological phenomena, yet rarely, if ever, is the list exhausted; there is not *time* to develop them all, or we have not time and opportunity to make correct observations. In dilatation of the heart, the retrograde pressure of venous blood obstructs the capillary circulation of the liver, the stomach, the spleen, the bowels, increasing congestion in all these organs, and giving rise from its slow occurrence, rather to dropsy or hemorrhage, than diarrhea or cholera; though diarrhea, or minature cholera, frequently alternates or coexists with the dropsy or hemorrhage; and we have frequently to produce, cholera, as it were, to relieve the dropsy.

It is a fact well known, that while a certain degree of congestion increases the secretion of glandular organs, a greater degree suspends their secretion. The difference between Epidemic cholera, and common cholera morbus, is in the extent, degree, and duration of congestion. In common cholera morbus, there is, for the most part, biliary secretion with the discharges; the congestion of the liver does not pass the secreting point. In epidemic cholera there is a suspension of the secretion of the liver; the congestion passes the secreting point, the suppressed secretion of the liver reacts back, and,—if the quantity of blood in the arterial system remains the same,—increases the venous congestion. The suppressed secretion, and the venous congestion, mutually act and react upon each other; hence the difference between epidemic cholera, and common cholera morbus,—the extent, degree, and duration of congestion, of pressure, is not the same.

Although the abdominal symptoms are so prominent, as to have conferred the name, 'cholera,' upon the condition under consideration, yet there are other than abdominal symptoms,—there is the feeble, and, sometimes imperceptible pulse, the pulmonary congestion, the precordial distress, the leaden, purple complexion, the cool or cold surface, and, finally, there is stupor, convulsions, coma and death. All this is exemplified, is Seen, in dilatation of the heart; and from the same cause—venous congestion, capillary obstruction, Pressure. The symptoms may vary in degree in different cases, from difference in extent, degree, and duration of congestion.

There being no valves in the internal system of veins, venous congestion increases the pressure of blood in the capillaries of all the organs,—hence the Sympathy, of organs.

This being the pathology of ague, of congestive chill, of cholera, let us enquire into the treatment. Compared with dilatation of the heart, cholera, is an acute ague, and therefore, requires, comparatively, acute or active treatment.—In fact, cholera, is dilatation of the heart—acute dilatation,—and although the point of departure be in the capillary circulation, yet in acute, as in chronic dilatation, we have mostly to deal with the effect,—the venous congestion, or proximate cause of the symptoms:—modified, somewhat, by the fact, that removal of exciting causes, have more immediate effect in removing the proximate cause, in acute than in chronic disease; or rather, the removal of exciting causes is more immediately important in acute than in chronic disease, *time* being more important, the system or part not being *habituated* to this state.*

Hence the first indication is, to remove all exciting causes, as confined air, mental depression, &c. If, upon removal of exciting causes, the proximate cause remains, our attention must be devoted to the proximate cause. Can the venous congestion, always be removed; and if removed, would a cure always be effected? We answer in the negative, unless under certain conditions, within a certain time. Can these conditions, this time, always be immediately determined?—In the present state of science, a negative answer must be returned to this question. Is there certainty in Medicine? We answer in the affirmative. Whence, then, the obscurity, the difficulty? We answer, in the complexity of the conditions, and unskillfulness in adapting means to the relief of those conditions. There is nothing in which man has agency, not even in the most perfect physical science, which he conducts invariably to the same issue. More should not be required from Medicine, than from simpler sciences. There are

* Cyclopaedia, Practical Medicine, vol. 1, page 317 —“Inflammation is, however, always necessarily preceded by an increased flow of blood to the part; and, by a *timely* removal of the exciting cause, this congestion may subside without passing into inflammation.”

many things besides complexity of conditions, and unskillfulness in adapting means to their relief, which tell upon the result, and over which the physician has but limited or no control. There is great difficulty, in many cases, in getting prescriptions and directions thoroughly carried out. He cannot always control the immediate circumstances which surround his patient; cannot control his feelings, emotions, appetites, &c. There are cases in which the indulgence of anger, mental depression, &c., might determine a fatal result; and there is no reflection upon the skill of the physician, no reflection upon the certainty of Medicine, unless all the conditions are complied with. If the venous congestion passes a certain degree, or duration, the capillaries may be so bruised, so lacerated by pressure, as to be incapable of maintaining the circulation after the venous congestion was removed,—incapable of maintaining the circulation long enough for their own recovery. But we cannot always tell when this is the case, and we must proceed upon the assumption that all cases are curable.

From incipient diarrhea, to collapse of cholera, there is, probably, no more important prescription or direction to be given, *than confinement to the horizontal position*. In commencing collapse, and during the stage of collapse, the patient should not be allowed to attain the erect position for any purpose. Two reasons may be assigned for this: 1st, Every effort made to attain the erect position, is at the expense of strength, which, if husbanded, might have sufficed to carry him through the crisis: in other words, these efforts produce exhaustion—congestion. 2d, The erect position, directly increases the retrograde pressure of venous blood in the capillaries of abdominal organs; the result of its weight or gravity. If we look at the great column of blood in the veins, in cholera, we may appreciate this. The erect position, then, is a present, operative, exciting cause; and consequently, must be removed. We have seen the symptoms mitigated by slightly elevating the pelvis and lower extremities, as by raising the foot of the bedstead, thus diminishing the pressure of venous blood in the capillaries. If the removal of exciting causes, fails to remove the proximate cause, whether we first diminish the pressure of blood by depletion, or increase the pressure of the solids by stimulants or tonics, will depend upon the extent, degree, and duration of congestion. We have seen that if congestion passes a certain degree, or duration, stimulants fail to remove it,

fail to overcome the obstruction ; and may convert the congestion into inflammation or fever. Bearing this in mind, we can appreciate why it is, that stimulants or tonics, as quinine, opium, brandy, strychnine, turpentine, muriated tinct. of iron, &c., sometimes prove remedies for cholera ; and bearing this in mind, we can appreciate why it is, that they sometimes fail, and do positive harm ; and we can also appreciate why it is, that depletion sometimes succeeds better than stimulants ; and why it is, that the combination of depletion, with stimulants, is better adapted to the generality of cases, than either alone. We frequently see an illustration of this in the treatment of chronic disease, where, from apparent debility, we are led to prescribe stimulants or tonics ; but find after a little, that the stimulants are not well borne ; that they excite a feverish state of the system, increasing pain, restlessness, &c. If, under these circumstances, we take the hint, and deplete to a certain extent, stimulants, or tonics are well borne and useful. The same thing is seen in the treatment of intermittent, or remittent, fever. They cannot always be broken up with quinine alone, but after depletion with mercurial cathartics or bleeding, then, quinine is successful. Carrying these facts, these principles into cholera, we see the cause of the discrepancy of opinion, and why one class of remedies are extolled, and another decried : it is because they are not adapted to the condition of the system at the time,—not adapted to the extent, degree, or duration of congestion.

We have said that large doses of morphia, are potent and powerful in the treatment of acute ague or cholera ; but for reasons before stated, they cannot relieve all cases.

Looking at the pathology of cholera through the medium of dilatation of the heart, we see the internal veins every where loaded with blood ; injecting, by hydraulic pressure, the capillaries ; arresting the secretion of glandular organs, and forcing out serum and blood. How, now, is this venous congestion to be removed ? We have seen that if it passes a certain extent, degree, or duration, stimulants or tonics cannot remove it. The only alternative, then, is depletion ; we must either let blood, or increase the secretion of the liver, or both. From the connection of the liver with the venous system, to increase its secretion, is directly to deplete that system—is, directly to diminish the retrograde pressure of venous blood in the capillaries ; and, therefore, is directly to mitigate the symptoms of cholera ; directly to mitigate the

symptoms of all constitutional affections. Hence the importance which has ever been attached to the Liver, in almost all affections; and hence the value of Mercury, in the treatment of almost all constitutional diseases. The very fact, that Mercury is the most certain agent known in increasing the secretion of the liver, and that it is prescribed in almost all constitutional affections, tends powerfully to establish a common pathology. That common pathology, is venous congestion; a retrograde pressure of venous blood in the capillaries; which increased secretion from the liver directly diminishes or removes, thus removing the fulcrum of the increased force of the heart in fever; and thus removing flux, hemorrhage, dropsy, convulsion, coma, &c., &c. Not that increased secretion from the liver, will always, and at once, relieve all general and local affections! This is not the position. To increase the secretion of the liver suddenly, and largely, might not be *adapted* to extent, degree, and duration of congestion; and, therefore, while some cases might be benefited by sudden and large secretion from the Veins, other cases might as certainly be made worse. Again, it must be borne in mind that what is true of the general, is true of the local circulation, and that therefore, while the general venous congestion might be removed through the liver, yet, from degree or duration of congestion, in some particular part, that local congestion might not be removed, and we might have local fever, or lingering diarrhea, or dysentery, after the general symptoms had subsided. Finally, if the depletion of the venous system through the liver, be carried beyond a certain point—be continued after the force of the arterial circulation has commenced to give way—the depletion abstracts from the quantity of blood in actual circulation, and consequently must defeat the object in view; must reproduce the state which it was designed to remove; namely, congestion. The same may be said of taking blood from a vein. There is a certain *limit* to the *salutary* operation of all remedial appliances.

In addition to the good effects of mercury in increasing the secretion of the liver, it is, probably,—when what is called its specific effect is produced,—the most powerful and permanent capillary stimulant known to the materia medica.—Hence it should not be given to salivation where there is a permanent obstruction to the general circulation, nor in a plethoric condition of the system, without sufficient depletion.

But if the congestion of the liver passess a certain degree, its secretion cannot be excited by mercury. How, then, are we to relieve the venous congestion? how diminish the retrograde pressure of venous blood in the capillaries? We answer, by Bleeding; by opening a vein in the arm, or foot, or, perhaps, the jugular. To let blood from a vein,—*the force of the arterial circulation remaining the same*,—is directly to deplete the venous system; is directly to diminish the retrograde pressure of venous blood in the capillaries; and, therefore, is directly to mitigate the symptoms of cholera; directly to mitigate the symptoms of all constitutional affections. By bleeding, the congestion may be brought within the scope of the power of calomel, morphine, and quinine.—The bleeding, perhaps, should be immediately preceded by calomel, morphine, and quinine; or at least it should be followed without loss of time, by these, or analogous remedies. It might make a very great difference if an interval of five minutes, one minute, or even less time, was allowed to elapse before stimulants or tonics were administered,—and a valuable means of relief, fall into unmerited disrepute. Bleeding should not be condemned, unless the collateral treatment was given, and the *time* when that collateral treatment was commenced, since there might be cases where bleeding was *indispensible* to relief, and yet fail for want of proper collateral treatment, and employed in proper *time*. The object of the bleeding is to bring the congestion within reach of other remedies—is, *co-operative*. From that able and philosophical article, Plethora, Cyclopedia Practical Medicine, we take the following extract :

“But the most impressive illustration of the debility connected with internal congestion, and of the effect of copious blood-letting in relieving it, is, perhaps, that which is furnished by the epidemic, or, as it is commonly termed, spasmodic cholera. In the pamphlet published by the London General Board of Health, by authority of the Privy Council, the following passage occurs: “But the remedy which is described to have been most uniformly successful, when it could be used, is bleeding, and this even in cases where the pulse was scarcely perceptible at the wrist. This practice seemed to apply itself to the root of the disease, by relieving the congestion of the venous system, which was *invariably* found loaded on examination after death, and which congestion (though only an effect of the first impression made by the attack of the disease on the constitution) appeared to be the

immediate cause of death. In the lighter cases, or in those of a severe nature which come under medical treatment before the pulse at the wrist was lost, or had become fluttering, bleeding was attended with the most decided advantage.—The oppression of the chest, the burning heat of the precordia, the spasms, the vomiting and purging, are stated in some instances to have ceased at once; at others, on a repetition of bleeding. In such as allowed a free abstraction of blood, these effects very uniformly occurred; but even in some, when the pulse was indistinct, bleeding was successful if it could be carried to the extent of eighteen, twenty-four, or thirty ounces, the pulse rising in power and becoming more distinguishable in proportion to the flow of blood. If the pulse in this state of feebleness, was distinct enough to give the finger the feeling of *oppression*, bleeding was almost always successful. The blood drawn was black, whether procured from a vein or an artery, and flowed with great difficulty, commonly first coming from the vein in drops, and gradually in a stream; but before it could be induced to flow with freedom, the patient often required warm baths, frictions, external and internal stimuli, to produce a sufficient quantity for his relief. If a small quantity only could be procured, the heart seemed to feel the loss without being relieved, the bulk of the blood actually circulating being reduced, while the great mass of it, congested in the inferior and superior vena cava, did not make its way to the heart. The effect of bleeding was mechanical, and acted only as removing an obstruction to the passage of the blood from the distended venous system; and if not carried far enough to remove this impediment and allow the large veins to empty themselves into the heart, such weakness was produced as is occasioned by the loss of blood in a constitution worn out by disease.” “This statement of the Board of Health, we adduce in preference even to the authorities from which it was derived. It was the result of deliberate and mature consideration of all the information which public records and private testimony could supply; it was issued to the public under a responsibility which must have precluded all slovenly examination of facts, all influence of speculative theories; and it hence carries authority as an announcement of facts, which no individual testimony could possess in equal degree.”

That it might be highly useful, in many cases, to bandage the abdomen, on the principle that we bandage a congested limb—to bandage the bowels, as it were, by large enemas, me-

chanically retained for a time—to apply leeches to the hemorrhoidal vessels—to administer stimulating emetics from their known power of filling the arteries, which blood must be derived from the internal veins—to apply warm embrocations of turpentine to the abdomen, limbs, and spine,—is appreciable to the pathology here advocated. We repeat, that in all cases of disease, local or general, the great Point to be observed, is, that remedial appliances must be *adaptive*—adapted to extent, degree, and duration of Congestion—of Pressure.

If it be said that there is little which is New in the doctrines advocated in this Essay,—we reply, that it is but an attempt, to connect together, the facts and minor generalizations already familiar to Medicine. A great obstruction to the advancement of Science, is the prevailing opinion that whenever Pathological, Social, or Political Phenomena shall be successfully generalised, something Mystical, some New and before unheard of idea will appear upon the horizon of Mind. It has been objected to the doctrine that the state, marked by the term Congestion, was the cause of all pathological phenomena,—that congestion was so Common that all knew it; that there was nothing New in the idea that congestion played a prominent part in the production of pathological phenomena; that even the Vulgar were constantly using the term;—forgetting, that it is *because* it is Common, that it is of the Greatest Importance. It may yet appear, that the familiar terms, Prejudice, Pride, and Ignorance, are marks of the State which gives rise to disease of the Mind, of Bodies Politic, to Overt Acts. It is *because* our Essay does not ignore the facts and minor generalizations already familiar to Medicine, then, that it may be true.

Should it be objected that we have attempted to explain the phenomena exhibited by Organic as well as Inorganic bodies, by an application of Physical Force, we reply, that we know as little what physical force, is, in itself, as we know of a vital, or any other assumed Force; and as what is called Physical Force, goes so far in explanation of the phe-

nomēna exhibited by organic and inorganic bodies. it is unphilosophical to assume the existence of a Distinet Force, to clear up the 'perturbations,' or 'residual phenomena.'

It must be borne in mind that the phrases, 'Law of Nature,' 'Law of Grāvitation,' &c., are but "generalised expressions of the conditions under which phenomena occur."

One true proposition, cannot overturn another true proposition. If it be true that Man, is a Mirror of the External World,—if it be true that the same Force which rolls the blood along his veins, rolls the Mississippi to the Gulf, rolls the deep currents of the Sea, rolls the Ocean's Tides, and heaves her Waves ;—it is still true, that within certain limits, he is the 'Builder of his own Fortunes,'—within certain limits, can control his own Actions, that therefore, he is a Responsible Being,—amenable to Law.

The Whole Truth, seems to be, that there is but One Cause, One God—Creator, and Preserver of All Things.





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